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ABSTRACT

Two innovations have developed in response to economic and educational concerns--the demand for workers who will be able to contribute productively in the workplaces of the coming decade and the pedagogical movement toward a closer integration of clasroom and work-based learning. One such innovation, called Tech Prep, has been incorporated into the 1990 Carl Perkins Act. This initiative, promoted by the U.S. Department of Education, links the last 2 years of high school with the first 2 years of postsecondary learning in a sequence that is coordinated with and leads to either an associate degree or certification of occupational skills in a specific career area. The second innovative program, called youth apprenticeship or work-based learning, was influenced by European apprenticeship systems. Youth apprenticeship programs meld Tech Prep-style coordination of secondary and postsecondary learning with paid work experience beginning in the last 2 years of high school, providing the context for both classroom and work-based learning. These two models are seen as competing solutions to the same problem: one is driven by labor market concerns, the other by educational concerns. The differences between the two will narrow in the coming years. (NLA)

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New US initiatives for the transition from school to work

As firms in the United States try to keep pace with rapid technological change and intensifying international competition, they have begun to focus on the need to improve the supply and the quality of entry level workers. The need for manufacturing and service industry technicians who are mature and are able to learn quickly has led employers and educators alike to explore ways to improve the connection between school and work for young adults. At the same time, recent educational and cognitive research on the value of contextual or situated learning has made the case that both academic and vocational learning can benefit from applied problem-solving in a work setting.

Two innovations have developed in response to these economic and educational concerns ie., the demand for workers who will be able to contribute productively in the workplaces of the coming decade; and the pedagogical movement toward a closer integration of classroom and work-based learning. One, called **Tech Prep**, has been incorporated into the 1990 reauthorisation of the Carl Perkins Act, which is the federal vocational education legislation. This initiative, promoted at the federal level by the US Department of Education, links the last two years of high school with the first two years of post-secondary learning in a sequence that is coordinated and leads to either an associate degree (signifying completion of a two-year college degree programme) or certification of occupational skills in a specific career area.

The second, often called **youth apprenticeship** or **work-based learning**, is a new, largely untested model for the US that is influenced by the success of many European apprenticeship systems. Youth apprenticeship programmes attempt to meld Tech Prep-style coordination of secondary and post-secondary learning with paid work experience beginning in the last two years of high school that provides the context for both classroom and work-based learning. This model is being advanced at the federal level by the US Department of Labor, which has recently funded six demonstration projects that involve employers, high schools and community colleges.

Tech Prep and 2 +2

Tech Prep is a programme that attempts to create rigour and structure for young people pursuing technical education, so that they emerge prepared not only for entry level jobs in technical fields but also for career advancement or four-year college. The bare bones of Tech Prep include: an articulation agreement between a local high school and community college that specifies a planned sequence of courses, both academic and vocational, that will lead participating students through high school toward a two-year associate degree

in their chosen technical field; and coordination not only of course sequence but of curricular materials within the course, to minimise duplication and repetition of material and learning sequences.

Articulation agreements that cover the last two years of high school and two years of community college are often called "2 + 2" plans. There are variations on this model: 4 + 2 programmes begin in school year nine rather than eleven; 2 + 2 + 2 initiatives provide for a six-year articulation plan that begins with the last two years of high school (years 11 and 12), moves through two years of community college and into the last two years of a four-year college (school years 15 and 16).

Tech Prep is meant to provide a rigorous, high-expectations alternative to the unfocused, inadequate general education curriculum that enrolls abour 40 percent of the students in many American high schools. (The other 60 percent of US high school students are split fairly evenly between vocational and college preparatory curricula). The term "Tech Prep" was chosen deliberately: like college prep, Tech Prep is intended to be a high status option designed, according the the American Association of Community and Junior Colleges (AACJC), to "raise the self-esteem level of general and vocational track students by enabling them to identify with a programme that has direction, status, and visible support from local employers."

Tech Prep has evolved from the efforts in the 1960s and 1970s to improve "articulation" between secondary schools and community colleges. Initially, articulation plans enabled high school students to take community college courses while still at high school, accelerating their progress toward an associate degree. This "time-shortened" approach fell out of favour in the 1980s as the size of the youth cohort shrank and high schools and community colleges began to work out "advanced curriculum" 2 +2 programmes that coordinated courses and curricula and raised the level of technical proficiency expected of students while requiring high school students to finish four years of high school before taking community college courses.

In 1984, Dale Parnell, President of the American Association of Community and Junior Colleges, published an influential book called *The neglected majority*. In that book Parnell argued eloquently for new structures and systems to educate and train the majority of American youths who do not complete a four-year baccalaureate programme. One of Parnell's central recommendations was the elimination of the general education track and its replacement with Tech Prep programmes that were targeted to: 1) the middle quartiles of the typical high school student body in terms of talent and interest and 2) the mid-range of occupations requiring some education and training beyond high school but not necessarily a baccalaureate degree. He presented a vision of a new route to employment and higher learning that would link high schools and community colleges in the provision of a four-year sequence that would have as its foundation a common core of proficiencies in maths, science, communications, and technology taught through an applied rather than abstract pedagogy.

Since 1984, Parnell's ideas have spread. Several states, such as Hawaii, Rhode Island and Delaware, implemented versions of 2 + 2 and Tech Prep programmes even before the federal government decided to authorise funds for such efforts. Indiana was one of several states to pass its own Tech Prep legislation in the mid 1980s.

The Centre for Occupational Research and Development in Texas has created Tech Prep curricula in applied maths, principles of technology, and applied communications and provides training workshops to school administrators and educators in how to move toward successful 2 +2 and Tech Prep programmes. In general, CORD's Tech Prep model starts students out in high school with applied academic and broad technical coursework, leaving specialty technical course work to the post-secondary level.

The culmination of efforts by Parnell and others had been the inclusion of Tech Prep in the 1990 Amendments to the Perkins Act. The Act now authorises special grants for secondary schools that join with two-year colleges or apprenticeship programmes for the purpose of creating new Tech Prep curricula. The law mandates that special consideration will be given in funding decisions to programmes developed in consultation with business, industry, and organised labour. For fiscal year 1991, Congress has appropriated $63.4 million, ensuring that the concept and the number of Tech Prep programmes will spread.

According to University of California economist David Stern, the best estimate of the extent of Tech Prep programmes in the United States is at present in the order of 122 programmes in 33 states. Some of these programmes are probably older; however, newer programmes are generally consistent with the federal government's definition of Tech Prep as a four-year, rigorous programme leading to skilled technical careers.

Some of the best Tech Prep programmes involve more than one high school and more than one community college. For example, a 2 + 2 programme to prepare "master technicians" in the field of electronics/electromechanical technology was created through collaboration between local education agencies (LEAs) and a business/industry/government consortium under the direction of the Virginia Community College System and the Virginia Department of Education. In Oregon, Portland Community College has joined with local high school district to form PAVTEC (Portland Area Vocational Technical Education Consortium), which in 1988 included 26 high schools in thirteen districts. PAVTEC currently coordinates Tech Prep programmes in about 50 different occupational fields, from accounting and computer field service to dental hygiene, hotel-motel management, industrial drafting, welding and more.

Youth Apprenticeship

A second model that is receiving significant attention in the United States today is called "youth apprenticeship." This new interest in apprenticeship starts from the recognition that the United States does not do a good job of preparing the majority of its young people for productive participation in the nation's economy and society. At the same time, it is clear that apprenticeship systems for young people are the cornerstone of a number of successful European national systems for preparing new entrants to the workforce for careers in a broad range of high-skill occupations. Many experts from industry, education, and youth policy have begun to argue that programmes that place high school students in real work settings and build the learning sequences around the work experience can provide a different, more effective way of preparing young people for both academic and occupational advancement than the current vocational education system.

Youth apprenticeship in the US is still more an idea than a reality. Most traditional apprenticeship programmes in the US begin at the age of 18 at the earliest and require a high school diploma. Average age in most US apprenticeship programmes, which are inordinately concentrated in the building and construction trades, is over 25 years of age. Moreover, apprenticeship in the US is so limited that fewer than two percent of high school graduates ever enter it.

In the 1970s, the federal government tried to encourage the expansion of existing apprenticeships to include high school students. This programme created part-time apprenticeships for high school students who would become full-time apprentices after graduation. This accelerated school-to-apprenticeship programme continued after federal funding ran out. At the same time, though, replication was limited and the programmes have not had significant impact on the structure of vocational education or high school education more broadly.

The current model of youth apprenticeship can be seen as an extension of 2 + 2/ Tech Prep models to include work-based learning opportunities. In the model proposed most commonly in this country, participants would enter a four-year programme at the end of school year 10 (following career exploration programmes in the middle school years). They would be paid a stipend by their employer while in the programme, which would enable them to earn a high school diploma, an associate degree from a two-year college, and a certificate of technical competence in their chosen field. Learning will take place in both the classroom and at the work site and curricular materials and teaching staffing patterns and activities will be designed to that end.

One organisation involved in several demonstration projects testing this model has specified the following guiding principles for youth apprenticeship in the United States. Programmes must:

> Establish new and better links between employers and schools, between academic and occupational instruction, and between work-based and classroom learning;
>
> Provide an opportunity for young people to advance both academically and occupationally, bridging high school and post-secondary education and providing completers with recognised certification in both areas;
>
> Provide entry to well-paying careers that offer both vertical and horizontal mobility;
>
> Have widespread and substantial employer support and respond to existing and anticipated employer demand for skilled workers;
>
> Be guided by a working coalition that includes: employers, secondary and post-secondary educational institutions, labour unions, employment and training providers and representatives of state government;
>
> Be seen as an opportunity to restructure high school education to improve significantly the opportunities available to millions of young people. They must not be another add-on to an already chaotic and fragmented education system.

The US Department of Labor has recently restructured its apprenticeship and training office, creating a new Office of Work-based Learning. Following a re-evaluation of apprenticeship in the US, the Depart-

ment concluded that the best aspects of the model should be diffused into non-traditional occupations and that apprenticeship-style training and education programmes should be expanded to new groups, including high school students. One result of that assessment was the decision to sponsor initiatives to encourage the spread of the apprenticeship concept among three distinct groups: new entrants to the workforce, existing employees, and small businesses.

This activity led to a round of Department of Labor demonstration projects focused specifically on the "school-to-work connection." In October 1990, six projects were selected for funding. All attempts to improve the integration of school and work and to include work experience components in their design. These programmes are being coordinated by a range of public and private sector institutions: the Los Angeles school system; the Pennsylvania Department of Commerce; the National Alliance of Business; the Maryland Department of Economics and Employment Development; the Boston Private Industry Council; and the Electronics Industry Foundation.

Perhaps the most ambitious of these projects are: Project Protech, an allied health professions youth apprenticeship initiative in Boston, involving the Boston schools, the leading teaching hospitals in the city, Bunker Hill Community College and the Boston Private Industry Council; and the Pennsylvania Youth Apprenticeship Project, a multi-site effort to create youth apprenticeship programmes in metalworking and advanced manufacturing, linking school districts, community colleges, large and small metalworking employers, the state's network of Industrial Resource Centres and the National Centre for Flexible Manufacturing, which is located in Meadville, Pennsylvania.

Project ProTech is designed to create formal pathways for students to enter professional careers in health care. In addition to a 2 +2 articulation, the four-year programme will provide student trainees with hospital employment coordinated with educational and vocational training delivered both in school classrooms and at the worksite. Programme content is being developed jointly by employers and educators at both the secondary and community college levels to create a closely integrated combination of classroom instruction, structured laboratory and occupational training and supervised work activity.

The Pennsylvania Youth Apprenticeship Project features development of new curricula and learning strategies integrating school-based and worksite based learning to prepare skilled workers for tomorrow's advanced manufacturing and metalworking industry in Pennsylvania. Time spent in classroom settings will decrease each year during the four-year programme, which will provide successful participants with a high school diploma, transferable post-secondary credits leading to an associate degree, and certification of broad technical competence that employers identify as necessary for entry level employment and career advancement.

Linking Tech Prep and Youth Apprenticeship

In effect, the youth apprenticeship model combines paid work experience in a job relevant to a student's career choice with a Tech Prep/2 + 2 programme that can take a student from high school through a rigorous technical education sequence

resulting in a two-year associate degree. What the youth apprenticeship model adds is the possibility of certification in occupational skills as well as the associate degree, plus new ways to integrate classroom and work-based learning.

Right now, these two models -- Tech Prep and Youth Apprenticeship -- are seen by some as competing solutions to the same problem. One is championed by the US Department of Labor, the other by the US Department of Education. One seems to be more driven by labour market concerns, the other by educational concerns. It is likely, however, that these differences will narrow rather than widen in the coming years and that the two models will interact rather than develop in parallel. There are several reasons for this: 1) federal funding for all school-to-work programmes is scarce and the Tech Prep funds will be of interest to youth apprenticeship efforts as they develop; and 2) employers looking for ways to improve their connection with schools and their access to quality young workers are likely to demand better integration at the local levels. Hopefully, the end result will be a sound, rigorous, and work-based approach to preparing the technical workers of tomorrow in the United States.